AS 4002.2—2001
ISO 4021:1992

Australian Standard™

Hydraulic fluid power—Particulate contamination of systems

Part 2: Extraction of fluid samples from an operating system

[ISO title: Hydraulic fluid power—Particulate contamination analysis—Extraction of fluid samples from lines of an operating system]

Standards Australia

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Australian Industry Group

Australian Institute of Petroleum

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Australian Standard™

Hydraulic fluid power—Particulate contamination of systems

Part 2: Extraction of fluid samples from an operating system

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PREFACE

This Standard was prepared by the Standards Australia Committee ME-035, Fluid Power Systems and Components to supersede AS 4002.1—1992, *Fluid power systems and components—Cleanness levels in hydraulic systems,* Part 1: *Classification and determination of cleanness,* in part.

The objective of this Standard is to provide manufacturers and users of hydraulic fluid power systems with procedures for extracting fluid samples from an operating hydraulic fluid power system.

This Standard is identical with and has been reproduced from ISO 4021:1992, *Hydraulic fluid power—Particulate contamination analysis—Extraction of fluid samples from lines of an operating system.*

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

Neither of the documents referenced in this Standard has been adopted as an Australian Standard.

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AUSTRALIAN STANDARD

Hydraulic fluid power—Particulate contamination of systems

Part 2:
Extraction of fluid samples from an operating system

1 Scope

This International Standard specifies procedures for extracting fluid samples from a hydraulic fluid power system under operation.

The preferred method is to extract fluid samples from a main flowline of an operating hydraulic system in such a manner that the particulate contaminant in the sample is representative of the fluid flowing at the point of sampling.

An alternative method is to extract a sample from the reservoir of an operating hydraulic system, but this method should only be used if a suitable sampler is not fitted.

The samples taken are used for particulate contamination analysis.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3722:1976, *Hydraulic fluid power — Fluid sample containers -- Qualifying and controlling cleaning methods.*

ISO 5598:1985, *Fluid power systems and components — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 and the following definitions apply.

3.1 clean sample bottle: Sample bottle which has been thoroughly cleaned and verified in accordance with ISO 3722.

3.2 fluid sampling, line: The extraction of a sample of fluid from a turbulent section of a flow stream.

3.3 fluid sampling, reservoir: The extraction of a sample of fluid from the reservoir of an operating system.

3.4 sampler: A device which allows the extraction of a quantity of representative fluid from the hydraulic system. (See figures 1 and 2.)

3.5 turbulent flow: Fluid flow in which particle movement, anywhere in the flow, varies rapidly in velocity and direction. Flow may be turbulent when the Reynolds number (Re) is greater than 2 300 and can be assumed to be turbulent when $Re \geqslant 4\,000$. See annex A.

4 Principles of fluid extraction

4.1 Sampling from fluid lines

4.1.1 Extract samples from main fluid lines in a section where turbulent flow conditions exist, using a sampler having the following characteristics (see example in figure 1):

a) being compatible with the fluid and the system operating pressure;

b) permitting on/off valving of sample flow;